



# **Intel® Desktop Board D865GRH Specification Update**

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The Intel® Desktop Board D865GRH may contain design defects or errors known as errata, which may cause the product to deviate from published specifications. Current characterized errata are documented in this Specification Update.

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The Intel® desktop board D865GRH may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

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## REVISION HISTORY

Date of Revision	Version	Description
December 2003	-001	This document is the first Specification Update for the Intel® Desktop Board D865GRH.
January 2004	-002	Added Specification Change 1. 2. Added Errata 1-7. Added Specification Clarifications 1, 2.
March 2004	-003	Added Specification Change 3.
April 2004	-004	Added Erratum 8.
May 2004	-005	Updated Erratum 8. Added Specification Clarifications 3, 4.
July 2004	-006	Updated Specification Clarification 4.
November 2004	-007	Added Erratum 9.

## PREFACE

This document is an update to the specifications contained in the *Intel® Desktop Board D865GRH Technical Product Specification* (Order number C53954). It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools. It will contain Specification Changes, Errata, Specification Clarifications, and Documentation Changes.

Refer to the *Intel® Pentium® 4 Processor Specification Update* (Order number 249199) for specification updates concerning the Intel Pentium 4 processor and that may apply to the desktop board D865GRH. Unless otherwise noted in this document, it should be assumed that any processor errata for a given stepping are applicable to the Altered Assembly (AA) revision(s) associated with that stepping.

Refer to the *Intel® 865G/865GV Chipset Specification Update* (Order Number 252515) for specification updates concerning the 82865G GMCH Controller and that may apply to the desktop board D865GRH. Unless otherwise noted in this document, it should be assumed that any MCH errata for a given stepping are applicable to the Altered Assembly (AA) revision(s) associated with that stepping.

Refer to the *Intel® 82801EB I/O Controller Hub 5 (ICH5) Specification Update* (Order Number 252517) for specification updates concerning the 82801ER I/O Controller Hub and that may apply to the desktop board D865GRH. Unless otherwise noted in this document, it should be assumed that any ICH 5 errata for a given stepping are applicable to the Altered Assembly (AA) revision(s) associated with that stepping.

## Nomenclature

**Specification Changes** are modifications to the current published specifications. These changes will be incorporated in the next release of the specifications.

**Errata** are design defects or errors. Characterized errata may cause the desktop board D865GRH's behavior to deviate from published specifications. Hardware and software designed to be used with any given Altered Assembly (AA) and BIOS revision level must assume that all errata documented for that AA and BIOS revision level are present on all desktop boards.

**Specification Clarifications** describe a specification in greater detail or further highlight a specification's impact to a complex design situation. These clarifications will be incorporated in the next release of the specifications.

**Documentation Changes** include typos, errors, or omissions from the current published specifications. These changes will be incorporated in the next release of the specifications.

**Specification Update for the  
Intel<sup>®</sup> Desktop Board D865GRH**





## GENERAL INFORMATION

**Basic Desktop Board D865GRH Identification Information**

AA Revision	BIOS Revision	Notes
C46980-201	BF86510A.86A.0046.P10	1-5
C46980-202	BF86510A.86A.0060.P16	1-5
C49314-201	BF86510A.86A.0046.P10	1-5
C49314-202	BF86510A.86A.0060.P16	1-5
C50084-201	BF86510A.86A.0046.P10	1-5
C50084-202	BF86510A.86A.0060.P16	1-5

NOTES:

1. The AA number is found on a small label on the component side of the board.
2. The 82865G Chipset kit used on this AA revision consists of two components as follows:

Device	Stepping	S-Spec Numbers
82865G GMCH	A2	SL743
82801EB ICH5	A3	SL73Z

3. Refer to the *Intel® Pentium® 4 Processor Specification Update* (Order Number 249199) for errata related to the Pentium 4 processor and that may apply to the desktop board D865GRH.
4. Refer to the *Intel® 865/865GV Chipset Specification Update* (Order Number 252515) for errata related to the 82865G GMCH that may apply to the desktop board D865GRH.
5. Refer to the *Intel® 82801EB I/O Controller Hub 5 (ICH5) Specification Update* (Order Number 252517) for errata related to the 82801ER I/O Controller Hub that may apply to the desktop board D865GRH.

## Summary Table of Changes

The following table indicates the Specification Changes, Errata, Specification Clarifications, or Documentation Changes that apply to the desktop board D865GRH. Intel intends to fix some of the errata in a future revision of the desktop board, and to account for the other outstanding issues through documentation or specification changes as noted. This table uses the following notations:

### CODES USED IN SUMMARY TABLE

Doc:	Document change or update that will be implemented.
Plan Fix:	This erratum may be fixed in a future revision of the desktop board, driver, or BIOS.
Fixed:	This erratum has been previously fixed.
No Fix:	There are no plans to fix this erratum.
Shaded:	This erratum is either new or modified from the previous version of the document.

NO.	PLANS	SPECIFICATION CHANGES
1	Doc	Change to description of the SMBIOS specification listed in Table 3, Section 1.4
2	Doc	Change to description of Section 2.11.1, DC Loading
3	Doc	Change to Thermal Considerations, Section 2.12
<b>ERRATA</b>		
1	Plan Fix	PCI slot 1 cannot be used with long PCI add-in cards
2	No Fix	Advanced jack sense may not recognize devices connected to a front panel audio port
3	No Fix	Advanced jack sense on boards with 6-channel audio will report "Microphone" for any device connected to the back panel microphone port (pink)
4	No Fix	Advance jack sense will not detect devices connected to the Center/LFE and Surround ports
5	No Fix	Advance jack sense may report amplified speakers as an array microphone when connected to the microphone port (pink)
6	No Fix	An additional reboot may be required after installing audio drivers for Microsoft Windows* 98SE or Windows ME
7	No Fix	Private Information Manager (PIM) may return an error message when used with non-English operating systems
8	Plan Fix	System memory may be reduced in excess of the amount of AGP aperture size when 4GB of system memory are used
9	Plan Fix	System may intermittently hang at POST code 75 with SATA hard disk drives attached
<b>SPECIFICATION CLARIFICATIONS</b>		
1	Doc	Clarification of DDR voltage
2	Doc	Clarification of Section 2.11.1, DC Loading
3	Doc	Change to description of Section 2.11.3, Fan Connector Current Supply, Correction of processor and voltage regulator fan current
4	Doc	Change to description of Section 2.9.1, Front Panel Audio Connector/Jumper Block

## SPECIFICATION CHANGES

The Specification Changes listed in this section apply to the *Intel® Desktop Board D865GBF/D865GLC Technical Product Specification* (Order Number C53954). All Specification Changes will be incorporated into a future version of that specification.

### 1. **Change to Description of the SMBIOS Specification Listed in Table 3, Section 1.4**

Table 3, Section 1.4, SMBIOS specification will change as follows:

**Table 3. Specifications**

Reference Name	Specification Title	Version, Revision Date, and Ownership	The information is available from...
SMBIOS	<i>System Management BIOS</i>	Version 2.3.4, December 6, 2002, Distributed Management Taskforce, Inc (DMTF)	<a href="http://www.dmtf.org/standards/documents/SMBIOS/DS P0134.pdf">http://www.dmtf.org/standards/documents/SMBIOS/DS P0134.pdf</a>

### 2. **Change to Description of Section 2.11.1, DC Loading**

Table 41, Section 2.11.1, DC Loading, will change in its entirety as follows:

## 2.11.1 DC LOADING

Table 41 lists the DC loading characteristics of the board.

**Table 41. DC Loading Characteristics**

Mode	DC Power	DC Current at:				
		+3.3 V	+5 V	+12 V	-12 V	+5 VSB
Minimum loading	190.00 W	5.00 A	11.00 A	9.00 A	0.03 A	0.60 A
Maximum loading	310.00 W	11.00 A	15.00 A	15.00 A	0.10 A	1.38 A

### 3. Change to Thermal Considerations, Section 2.12

Section 2.12, Thermal Considerations will change in its entirety as follows:

## 2.12 Thermal Considerations



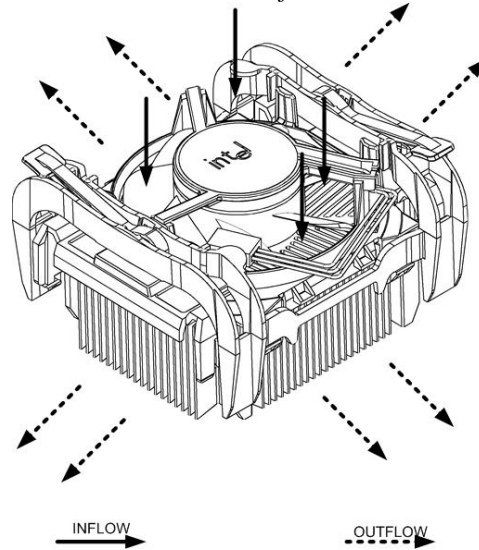
### CAUTION

*The use of an Intel® Pentium® 4 processor operating above 2.80 GHz with this Intel® desktop board requires the following:*

- *A chassis with appropriate airflow to ensure proper cooling of the components on the board*
- *A processor fan heatsink that meets the thermal performance targets for Pentium 4 processors operating above 2.80 GHz*

*The use of an Intel Pentium 4 processor with 1 MB of L2 cache on this Intel desktop board requires the following:*

- *A chassis with a maximum internal ambient temperature of 38 Degrees Celsius*
- *A processor heatsink that provides omnidirectional airflow so that air is drawn across the processor voltage regulator area (item A in Figure 26). Figure 25a illustrates an omnidirectional airflow heatsink.*



**Figure 25a. Omnidirectional Airflow Heatsink**

*Failure to ensure appropriate airflow may result in reduced performance of both the processor and/or voltage regulator or, in some instances, damage to the desktop board. For a list of chassis that have been tested with Intel® desktop boards please refer to the following website:*

<http://developer.intel.com/design/motherbd/cooling.htm>

*All responsibility for determining the adequacy of any thermal or system design remains solely with the reader. Intel makes no warranties or representations that merely following the instructions presented in this document will result in a system with adequate thermal performance.*

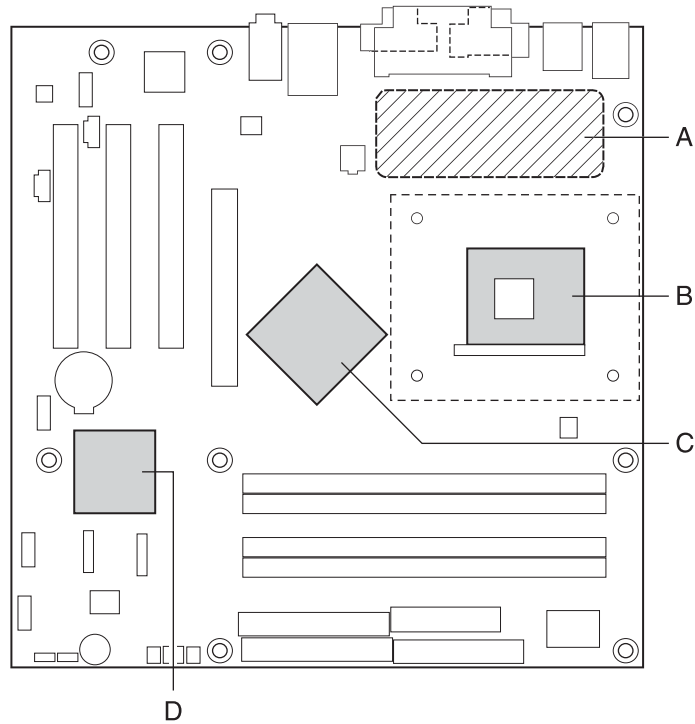
**CAUTION**

*Ensure that the ambient temperature does not exceed the Desktop Board's maximum operating temperature. Failure to do so could cause components to exceed their maximum case temperature and malfunction. For information about the maximum operating temperature, see the environmental specifications in Section 2.14.*

**CAUTION**

*Ensure that proper airflow is maintained in the processor voltage regulator circuit. Failure to do so may result in damage to the voltage regulator circuit. The processor voltage regulator area (item A in Figure 26) can reach a temperature of up to 85 °C in an open chassis.*

Figure 26 shows the locations of the localized high temperature zones.



OM16506

Item	Description
A	Processor voltage regulator area
B	Processor
C	Intel® 82865G GMCH
D	Intel® 82801EB ICH5

**Figure 26. Localized High Temperature Zones**

Table 43 provides maximum case temperatures for the Desktop Board D865GRH components that are sensitive to thermal changes. The operating temperature, current load, or operating frequency could affect case temperatures. Maximum case temperatures are important when considering proper airflow to cool the Desktop Board D865GRH.

**Table 43. Thermal Considerations for Components**

<b>Component</b>	<b>Maximum Case Temperature</b>
Intel® Pentium® 4 processor	For processor case temperature, see processor datasheets and processor specification updates
Intel® 82865G GMCH	99 °C (under bias)
Intel® 82801EB ICH5	115 °C (under bias)

<b>For information about</b>	<b>Refer to</b>
Intel Pentium 4 processor datasheets and specification updates	Section 1.2, page 16

## ERRATA

### 1. ***PCI Slot 1 Cannot be Used With Long PCI Add-in Cards***

**PROBLEM:** A tall capacitor is located 3 ¼ inches behind PCI slot 1.

**IMPLICATION:** PCI cards conforming to the PCI specification but exceed 8 inches in length, may not be useable in PCI slot 1.

**WORKAROUND:** None.

**STATUS:** This erratum may be fixed in a future hardware revision.

### 2. ***Advance Jack Sense May Not Recognize Devices Connected to a Front Panel Audio Port***

**PROBLEM:** The advanced jack sense with Auto Topology Switching, that is used by the audio codec to recognize what device is connected to an audio port, may fail to report devices connected to a front-panel port.

**IMPLICATION:** Devices connected through a front panel audio port will be detected and function correctly, but the advance jack sense wizard will only report the device at start up.

**WORKAROUND:** None.

**STATUS:** This erratum will not be fixed.

### 3. ***Advance Jack Sense on Boards with 6-Channel Audio Will Report “Microphone” for Any Device Connected to the Back Panel Microphone Port (Pink)***

**PROBLEM:** For boards with 6-channel audio, the advanced jack sense with Auto Topology Switching, that is used by the audio codec to recognize what device is connected to an audio port, will report “Microphone” for any device connected to the back panel pink microphone port.

**IMPLICATION:** The advanced jack sense wizard will report any device connected through the back panel microphone port to be a “Microphone” and the wizard will prompt the user to verify this detection assumption.

**WORKAROUND:** None.

**STATUS:** This erratum will not be fixed.

### 4. ***Advance Jack Sense Will Not Detect Devices Connected to the Center/LFE and Surround Ports***

**PROBLEM:** Polling devices connected to the Center/LFE and Surround port would cause popping noise once speakers are connected. Due to this anomaly, the advance jack sense wizard will not poll and report devices connected to the Center/LFE and Surround ports although these devices will work correctly.



**IMPLICATION:** Devices connected to the Center/LFE or Surround port will be detected and function correctly, but the advance jack sense wizard will not poll and report the device.

**WORKAROUND:** None.

**STATUS:** This erratum will not be fixed.

### **5. *Advance Jack Sense May Report Amplified Speakers as an Array Microphone When Connected to The Microphone Port (Pink)***

**PROBLEM:** The presence of voltage bias on the microphone jack during the detection phase is required for accurate detection, but amplified speakers and array microphones have very similar impedance values.

**IMPLICATION:** Amplified speakers will be detected and function correctly, but the advance jack sense wizard may report the device as an array microphone.

**WORKAROUND:** None.

**STATUS:** This erratum will not be fixed.

### **6. *An Additional Reboot May Be Required After Installing Audio Drivers for Microsoft Windows\* 98SE or Windows ME***

**PROBLEM:** An application post-installer completes the driver installation and requires an additional reboot to get full functionality in Windows 98SE or Windows ME.

**IMPLICATION:** An additional reboot is required after installing audio drivers for Windows 98SE or Windows ME.

**WORKAROUND:** None.

**STATUS:** This erratum will not be fixed.

### **7. *Private Information Manager (PIM) May Return an Error Message When Used with Non-English Operating Systems***

**PROBLEM:** When using a non-English operating system, typing characters that are not in the normal ASCII character-set will cause an error message the next time PIM is started. A PIM update is required.

**IMPLICATION:** Using a non-English operating system and typing characters not in the normal ASCII character-set will cause an error message the next time PIM is started.

**WORKAROUND:** A PIM update is available from [http://www.wave.com/support/downloads\\_PIM.html](http://www.wave.com/support/downloads_PIM.html).

**STATUS:** This erratum may be fixed in a future product release.

## **8. System Memory May Be Reduced in Excess of the Amount of AGP Aperture Size When 4GB of System Memory are Used**

**PROBLEM:** The AGP aperture size setting in the system BIOS will consume, from available system memory, 2 times the amount applied in the AGP aperture setting when the maximum of 4 GB of system memory is installed.

**IMPLICATION:** When 4GB of system memory are used, and system memory is allocated to AGP aperture size in BIOS Setup, available system memory may be reduced by twice the amount allocated. A similar impact to available system memory may occur from any allocation of system memory when 4 GB of system memory is used. For example, increasing the video frame buffer in BIOS may also reduce available memory in excess of the amount requested.

**WORKAROUND:** None.

**STATUS:** This erratum may be fixed in a future BIOS revision.

## **9. System May Intermittently Hang at POST Code 75 with SATA Hard Disk Drives Attached**

**PROBLEM:** An intermittent hang at POST code 75 may be observed when SATA Hard Disk Drives are used. This intermittent hang is due to an erroneous circuit race condition in the system clock when spread spectrum is enabled by BIOS.

**IMPLICATION:** The system hang is exhibited when the system clock's internal circuitry is erroneously enabled when spread spectrum is enabled on PLL1.

By setting the SMBUS register byte 0, bit 7, to 1 before spread spectrum is enabled and also enabling spread spectrum earlier in the boot process (prior to enabling the SATA ports), this hang condition is avoided.

**WORKAROUND:** The user will need to reset the system.

**STATUS:** This issue may be fixed in a future BIOS revision, which allows the SATA Hard Disk Drives to be reinitialized..

## SPECIFICATION CLARIFICATIONS

The Specification Clarifications listed in this section apply to the *Intel® Desktop Board D865GBF/D865GLC Technical Product Specification* (Order Number C53954). All Specification Clarifications will be incorporated into a future version of that specification.

### 1. Clarification of DDR Voltage

Section 1.6, System Memory, will change as follows:

#### 1.6 System Memory

The Desktop Board D865GRH has four DIMM sockets and supports the following memory features:

- 2.6 V (only) 184-pin DDR SDRAM DIMMs with gold-plated contacts
- Unbuffered, single-sided or double-sided DIMMs with the following restriction:  
Double-sided DIMMS with x16 organization are not supported.
- 4 GB maximum total system memory. Refer to Section 2.2.1 on page 63 for information on the total amount of addressable memory.
- Minimum total system memory: 64 MB
- Non-ECC DIMMs
- Serial Presence Detect
- DDR400, DDR333, and DDR266 SDRAM DIMMs

### 2. Clarification of Section 2.11.1, DC Loading

Clarification to Section 2.11.1, DC Loading, will be added as follows:

#### 2.11.1 DC LOADING

Table 41 lists the DC loading characteristics of the board. This data is based on a DC analysis of all active components within the board that impact its power delivery subsystems. The analysis does not include PCI add-in cards. Minimum values assume a light load placed on the board that is similar to an environment with no applications running and no USB current draw. Maximum values assume a load placed on the board that is similar to a heavy gaming environment with a 500 mA current draw per USB port. These calculations are not based on specific processor values or memory configurations but are based on the minimum and maximum current draw possible from the board's power delivery subsystems to the processor, memory, and USB ports.

Use the datasheets for add-in cards, such as PCI and AGP, to determine the overall system power requirements. The selection of a power supply at the system level is dependent on the system's usage model and not necessarily tied to a particular processor speed.

### 3. ***Change to Description of Section 2.11.3, Fan Connector Current Supply, Correction of Processor and Voltage Regulator Fan Current***

Section 2.11.3, Fan Connector Current Supply will change in its entirety as follows:

#### **2.11.3 FAN CONNECTOR CURRENT CAPABILITY**



#### **CAUTION**

*The processor fan must be connected to the processor fan connector, not to a chassis fan connector. Connecting the processor fan to a chassis fan connector may result in onboard component damage that will halt fan operation.*

Table 42 lists the current capability of the fan connectors.

**Table 42. Fan Connector Current Capability**

<b>Fan Connector</b>	<b>Maximum Available Current</b>
Processor fan	1600 mA
Front chassis fan	600 mA
Rear chassis fan	600 mA

### 4. ***Change to Description of Section 2.9.1, Front Panel Audio Connector/Jumper Block***

Section 2.9.1, Front Panel Audio Connector/Jumper Block will change in its entirety as follows:

#### **2.9.1 FRONT PANEL AUDIO CONNECTOR/JUMPER BLOCK**

This connector has two functions:

- With jumpers installed, the audio line out signals are routed to the back panel audio line out connector.
- With jumpers removed, the connector provides audio line out and mic in signals for front panel audio connectors.

Table 39 describes the two configurations of this connector/jumper block.



**CAUTION**

*Do not place jumpers on this block in any configuration other than the one described in Table 39. Other jumper configurations are not supported and could damage the Desktop Board.*

**Table 39. Front Panel Audio Connector/Jumper Block**

Jumper Setting	Configuration
<p>1 2 3 4 5 6 7 8 9 10</p> <p>5 and 6</p> <p>9 and 10</p>	<p>Audio line out signals are routed to the back panel audio line out connector. The back panel audio line out connector is shown in Figure 16 on page 74</p>
<p>1 2 3 4 5 6 7 8 9 10</p> <p>No jumpers installed</p>	<p>Audio line out and mic in signals are available for front panel audio connectors. Table 26 on page 77 lists the names of the signals available on this connector when no jumpers are installed.</p>



**INTEGRATOR'S NOTE**

*When the jumpers are removed and this connector is used for front panel audio, the back panel audio line out and mic in connectors are disabled.*